MANUAL

OF

AGRICULTURE

HORTICULTURE

AND

ARBORICULTURE

BY

Doctor HUBERT LaRUE, M. A., M. D.,
PROFESSOR LAVAL UNIVERSITY.

QUEBEC
PRINTED BY C. DARVEAU
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Nourishment of plants.

Question.—How do plants feed ?

Answer.—Plants feed principally through their roots and leaves.

Q. How do these roots and leaves operate ?

A. The roots act as so many small mouths, extracting from the earth a part of the nourishment which the plants require ; and the leaves find in the atmosphere the remaining portion of the food necessary to the life of these same plants.

Q. What is meant by the words rich or fertile soils, and poor or infertile soils ?

A. A soil is said to be rich or fertile, when it contains a sufficient quantity of the substances necessary to the nourishment of plants ; it is said to be poor or infertile when it does not contain these substances, or contains but a small proportion of them.

Q. Why is the soil of most of our farms actually poor and infertile ?

A. Because having been tilled during a great number of years without dung or manure, it contains no longer the substances necessary for the nourishment and the life of the plants.

Various kinds of soil.

Q. How many principal kinds of soil are there ?

A. For the usual practical purposes, soils can be divided into two special kinds : 1° strong soils or clay soils, 2° light or sandy soils.

Q. What is the difference between the composition of a strong soil, and that of a light soil ?

A. Strong soils contain a large quantity of clay with but little sand ; light soils contain much sand and little clay.

Q. Are strong soils all of the same kind ?

A. No ; some soils are so strong that they are unfit for culture. The best are those composed of a mixture of clay and sand in due proportion.

Q. What do you call soils composed of a mixture of sand and clay in due proportion ?

A. They are generally called mould.

Q. Are the light soils all of the same quality ?

A. No ; there are soils so light, as, for example the sandy shore soils, that they are not susceptible

of cultivation. The good light soils are those containing a certain quantity of clay.

Q. What are the advantages of good light soils ?

A. Good light soils offer the following advantages : 1° they can be more easily husbanded in all seasons. 2° They require less work ; 3° they are more readily permeated by the rain ; 4° they require little or no drainage.

Q. What are the advantages of the good strong soils or moulds ?

A. 1° they can be easily husbanded in nearly all seasons ; 2° they are readily permeated by the rain which they retain for a sufficient length of time and not in a too large quantity, provided they are properly drained ; 3° these soils are best adapted for the cultivation of most plants, and for meadow lands.

Q. What are the inconveniences of too strong soils ?

A. The inconveniences of too strong soils are the following : 1° these soils are heavy, difficult to plough and to husband, and are not easily penetrated by the atmosphere, by heat or rain ; 2° when once they are permeated by water, they hold it for a long time and in large quantities, which often causes the roots to rot ; 3° in very dry weather, they split and rift, and the plants perish, in consequence of their roots being laid bare and exposed to the atmosphere or choked.

Q. What are the inconveniences of too light soils ?

A. The inconveniences of too light soils are the following : 1° they are too easily penetrated by the atmosphere, and above all by the rays of the sun ; 2° they do not hold the rain water long enough, and dry up in a very short time.

Q. What is the action of manure with regard to these soils.

A. In strong soils, the manure is gradually and slowly decomposed and its beneficial effects are long felt ; in light soils on the contrary, the manure is rapidly decomposed, and its beneficial action is of but short duration.

Q. Can the over strength or the over lightness of soils be lessened ?

A. Yes the over strength, or over lightness of soils can be lessened by improvements.

Improvements.

Q. What is meant by the word improving the land ?

A. The land is said to be improved when one kind of earth is mixed with another possessing different properties, or when certain substances added thereto change its properties.

Q. Give illustrations of improvements.

A. If on an acre of over-strong soil, I cart light soil, sand, loam, gravel, lime, ashes, swampy soil &c.,

then I improve it. If over an acre of over light soil I cart clay or strong soil, I still improve it.

Q. Can the cleansings of the ditches be made use of towards such improvements ?

A. The cleansings of the ditches should always be made use of as improvements. When these cleansings consist of strong soils, they should be spread over light soils ; when they consist of sandy or loamy soil, they should be spread over strong soils.

Q. How are the cleansings of ditches generally disposed of in this country ?

A. The cleansings are generally deposited on each side of the ditches, when they become objectionable by preventing the easy flowing of the water, interfering with the drainage.

Q. When you have carted strong soil on light soil or sandy or light soil on strong soil, what is to be done ?

A. The soil should be lightly ploughed, so as to thoroughly mix together the two different kinds.

Q. When the soil used as improvement is strong soil, must the ploughing be made immediately after the carting ?

A. When the soil used as improvement is strong soil, it is better to leave it on the ground during a few months before ploughing, in order that the clods may have time to become pulverized.

Q. Can the improvements, in certain cases, be done in a more economical manner ?

A. Yes ; when, for instance, a layer of over strong soil is spread over a layer of light soil, or when a layer of over light soil is spread over a layer of strong soil.

Q. How, in this case is the improvement made ?

A. The improvement, in this case is made by deep ploughings, which mix these two kinds of earth together.

Q. Do you know of any other method of improving an overstrong soil ?

A. Strong soils are also improved by frequent ploughing and harrowing, by the use of vegetable manure, and by the cultivation of certain plants, as for instance, turnips, carrots, beets and potatoes.

Q. What is the result of frequent ploughing and harrowing, and of the cultivation of vegetables.

A. By frequent ploughing and harrowing, and by the cultivation of vegetables, the soil is pulverized and its consistence and strength are diminished.

Tilling of the soil.

Q. What are the principal operations necessary for the sowing of seeds ?

A. The principal operations necessary for the sowing of seeds are : the ploughing, harrowing, rolling, and dunging of the soil.

Ploughing.

Q. Of what use is ploughing ?

A. Ploughing 1° loosens the soil 2° destroys the weeds ; and 3° mixes the earth with the improvements and the manure.

Q. What are the principal kinds of ploughing ?

A. The principal kinds of ploughing are: the deep ploughing, the light or superficial ploughing ; the fall and spring ploughing.

Q. What is meant by deep and light ploughing.

A. Ploughing is said to be deep when the plough is sunk 7 or 8 inches below the surface of the soil ; it is said to be light when the plough is sunk only 4 or 5 inches.

Q. Has deep ploughing on strong soils good results during a drought.

A. Deep ploughing on strong soils has good results in a drought, because in that case the water rises up to the surface and moistens the roots.

Q. Are deeper ploughings made in certain other cases, than those you have mentioned ?

A. Yes, in certain cases, the depth of the ploughing is from 9 to 10 inches. This kind of ploughing is called breaking. The breaking is done by means of particular ploughs called sub soil ploughs.

Q. Do deep ploughings agree with all kinds of soils ?

A. Deep ploughings agree with all soils that are not too light.

Q. What are the effects of deep ploughing in strong earth or mould ?

A. Deep ploughing in strong earths or mould, loosens and pulverizes a deeper layer of earth.

Q. What are the principal results of this deep loosening ?

A. The principal results of this deep loosening are : 1° to allow the roots of the plants to shoot more easily through the soil to draw their nourishment from it, 2° to allow the rain to penetrate more deeply in the earth, which prevents it from accumulating around the roots in wet years.

Q. How can the water damage the roots, when collected in too great quantities around them ?

A. When there is too much water around the roots, it causes them to rot, and consequently destroys the plants.

Q. In what cases is light ploughing best suitable ?

A. Light ploughing suits best, 1° in overlight soils, because in this case, one must not seek to loosen the earth which is already too loose ; 2° in cases when the layer of good arable earth is thin, and when loam and gravel are found underneath, etc.

Q. In what instances is fall ploughing most suitable ?

A. Fall ploughing suits best in strong soils or mould, and especially in lands that have been long uncultivated or kept as meadows.

Q. What are the good effects of this fall ploughing ?

A. The good effects resulting from this fall ploughing are, that the ridges lifted by the plough being exposed to the atmosphere and to the frost, become friable and loosened ; this fall ploughing moreover is a great step towards hastening the spring work which is of a great importance considering the shortness of our seasons.

Q. In what instances is the fall ploughing not to be resorted to ?

A. The fall ploughing does not agree with over light or loose soils, because the action of the atmosphere and of the frost would further loosen them.

Q. Are there still other inconveniences attending fall ploughing in over light soils ?

A. Yes ; with sloping land composed of over light soils the heavy fall and spring rains wash away the clay which is lighter than sand, and carries it down to the streams and ditches.

Q. How is the result of the heavy rains on the fall ploughing generally called ?

A. It is then generally said that the soil has been impoverished or washed.

Q. How can it be ascertained that the ploughing has been carefully done ?

A. The ploughing has been carefully done 1° when the ridges of earth cut by the plough are straight, of equal thickness and width ; 2° when they are all regularly overturned so as to lap evenly over one another; 3° when the beds are all of an equal width ; 4° when the furrows which divide them are narrow and straight.

Q. What inconveniences arise from the fact that a ridge when ploughed does not lap evenly on another ?

A. If a ridge when ploughed does not lap evenly on another, sinkings and holes are produced wherein water accumulates, which causes the plants to perish by their roots being drowned or by the effects of frost; the seeds moreover not being buried to the same depth do not shoot and ripen at the same time.

Q. What width can be best given to the beds ?

A. The best width for beds is generally from 12 to 18 feet in strong soils and greater in light soils ; this varies however according to circunstances.

Q. What is the best direction to be given to the beds, in strong soils ?

A. The best direction to be given to the beds in strong soils is that which best facilitates their drainage: that is the direction which follows the slope of the field.

Q. Why should the furrows which divide the beds be straight?

A. Firstly, because beds having straight furrows look better, and secondly because they are more easily drained.

Q. Has a good ploughing a very great influence on the yielding of a peace of land?

A. Yes; without good ploughing a good harvest or good meadows can hardly be expected.

Q. Point out the faults which are noticeable in the manner of ploughing in this country.

A. The principal are the following: 1° the ridges are not properly overturned, so that, very often, instead of lapping regularly on one another, they lie flat; 2° the centre of the bed instead of being somewhat higher than the sides is often lower, which allows the water to stagnate and causes the plants to die; 3° at other times the centre of the bed is much too high, so that if the bed is too narrow, it has the shape of a loaf of sugar; 4° the beds are too narrow, which uselessly increases the number of furrows and causes a waste of land; 5° the beds are far from having all the same width: thus, on the same field, beds three feet wide are seen alongside of beds from twelve to fifteen feet wide; 6° the furrows are generally zig-zagged, causing the water to flow imperfectly, and giving the field a bad appearance.

Harrowing.

Q. What are the effects of harrowing ?

A. The effects of harrowing are 1° to loosen and level the earth ; 2° to bury the seeds to a proper depth.

Q. What are the different kinds of harrows ?

A. Harrows are made of various shapes ; the principal kinds are the following : single harrows, double harrows, set with wooden or iron teeth.

Q. What is the difference betwen single and double harrows ?

A. Double harrows are at least twice as wide as the single ones, so that more work can be done with them in a given length of time.

Q. Is the same team used for single and double harrows ?

A. One horse is sufficient for single harrows, the double ones require two.

Q. Do harrows set with wooden or iron teeth agree equally well with all kinds of soils ?

A. The wooden teeth harrows may answer the purpose in light or sandy soils which are not too full of weeds ; but for strong soils, the iron teeth harrows are indispensable because they work more deeply in the soil and loosen it to a greater extent.

Q. Is one single harrowing always sufficient ?

A. One single harrowing is generally sufficient, in very light soil, but in strong soil two or three or sometimes more are required.

Q. When two harrowings are made in a strong soil, what is the best process to adopt ?

A. The best process to adopt is to harrow lengthwise and then crosswise.

Q. At what time should the harrowing be done ?

A. When the earth is not too wet or too dry.

Q. Is harrowing a very important operation ?

A. Harrowing is a most important operation, it not only buries the seeds, but destroys the weeds, loosens the earth, and facilitates the sprouting of the shoots.

Q. What are the principal faults noticeable in the manner of harrowing in this country ?

A. Very often, the harrowing is done carelessly. In many parishes, the use of iron teeth harrows is unknown, and most frequently the field is harrowed once only, when two or three harrowings are necessary. The teeth of the harrows are not kept in good order, not sharpened, and the consequence is that the earth instead of being harrowed, is merely scratched, so that all the lines of the ploughing are visible. A great many fields hardly yield any crop from the want of proper harrowing.

Rolling.

Q. How is the rolling done?

A. The rolling is done by running on the land, after it has been harrowed, rollers made of wood, of stone or of iron; these rollers are drawn by horses.

Q. What are the effects of rolling on strong soils,

A. The effects of rolling on strong soils are to break up the sods, to pulverize them and consequently to loosen the earth. On these lands, toothed rollers are often used (Croskill rollers) which break up the clods easily and prevent the soil from getting crusty.

Q. What are the effects of rolling on light soils?

A. On light soils the action of the roller is to settle the earth, and to give it more consistence and strength. By this process the dampness of the soil is better preserved, the atmosphere and heat do not penetrate it so readily and the roots are less exposed to be laid bare. The heavier the roller, the more profitable the work will be.

Q. What is the best time to roll strong soils?

A. The rolling in strong soils should take place when the earth is neither too damp nor too much hardened by the drought. When the earth is too damp, the clods, instead of being pulverized by the action of the roller, are merely flattened; besides, the weight of the roller forms a crust which hardens

and prevents the shooting of the plants. When the earth is too dry, the clods being hardened do not crumble under the pressure of the roller.

Q. What is to be done if the earth becomes crusty after the rolling ?

If owing to a fall of rain the earth becomes crusty after rolling, harrowing must be resorted to, to break up this crust, otherwise the seed would mostly perish. This harrowing does not affect the seeds, even when they have sprouted.

Q. Is rolling very useful on strong soils ?

A. Rolling is very useful on strong soils; it completes the loosening produced by the ploughing and harrowing.

Drainage.

Q. What is meant by drainage ?

A. By drainage is understood all work having for its object the removing of the surplus of either water or dampness contained in the earth.

Q. How is this drainage done ?

A. Drainage is done in two different ways: 1° by means of furrows, gutters, and open ditches; 2° by sewerage.

Q. How do furrows gutters and ditches work ?

A. The furrows, receive the excess of water or dampness contained in the beds : the gutters receive

the water from the furrows, and carry it to the ditches.

Q. How can you tell when a furrow is properly made ?

A. A furrow is properly made : 1° when it slopes gently and evenly so as to allow the water to flow freely towards the gutter or the ditch ; 2° when it is straight, for the water flows more freely in a straight line ; 3° when there are no earth clods in the furrow, nor stones or sticks of wood to interfere with the easy flowing of the water ; 4° when the furrows are not too deep, especially when mowers or reapers are to be employed.

Q. Is it important that the drainage should be made properly ?

The best of ploughing, harrowing and rolling would be useless without it ; if the soil is not properly drained. it will remain infertile and weeds of all kinds will occupy the place of the useful plants. On improperly drained meadows, ice will form and freeze the roots of the grass. In short, lands improperly drained can only be sowed late in the spring.

Q. What are the chief effects resulting from a good drainage in a strong or cold soil ?

A. One of the chief effects of a good drainage on a strong and cold soil is to make it warmer, which allows not only to sow earlier in the spring, but to

reap sooner in the fall ; the yielding, besides, is much larger.

Q. At what time is it specially important to remedy the defects of the ditches, furrows and gutters ?

A. The ditches should be cleaned before the fall rains ; the furrows should be cleansed as fast as the ploughing is done ; in the fields sown with grain or vegetables, these defects ought also to be remedied immediately after the sowing ; as to meadows, fall is the best time, after the frost.

Q. What is the best time for ascertaining the defects in the furrows and drains ?

A. The best time is after the heavy rains ; the places where the water gathers are then easily seen and the causes which interfere with the drainage better understood.

Q. Which is the best shape to be given to the furrows, gutters and ditches ?

A. The best shape is when their edges slope gently ; if cut perpendicularly, they fall in, and the ditches are constantly obstructed.

Q. What defects are noticeable in the manner of draining in this country ?

A. The drainage is far from being done with proper care. The furrows and gutters, instead of being straight, are nearly always bending in and out ; instead of having a uniform and even slope, they are obstructed by stones, clods and sticks. The

earth which is taken from the ditches, instead of being used as an improvement, is thrown on each side of them where it forms dikes which block up the extremities of the beds and furrows and interfere with the drainage.

Q. In what manner is draining done ?

A. There are different modes of draining ; but whatever mode is adopted, the ditches must be first opened with a slope towards a deeper main ditch, named " collecting ditch."

Q. What is next to be done ?

A. Earthern tiles are then placed end to end in those ditches and covered with earth ; these pipes are called drain-tiles. (1)

Q. Can other materials be employed, in place of these earthern pipes ?

A. Instead of these, stones or pebbles which abound on some of our farms can be used, providing they are not too large.

Q. Can wood be used for draining purposes, and in what manner ?

A. Wood can be used for draining purposes in the following manner : in open ditches, as it has already been said, two round pieces about the size of a leg

(1) These pipes cost in Montreal, at Bulmer and Sheppard's, $8.00 a thousand ; and a thousand feet, in ordinary circumstances are sufficient for the drainage of an acre of land.

or arm, as for instance fur trees stripped of their branches, are laid flat on the bottom of the ditch and an open space of from two to three inches is left between them. Over these a third piece of fur or a flitch is placed. This operation is performed through the whole length of the ditch as far as the main or collecting ditch. These ditches or drains are then covered with earth.

Q. Do you know of any other method of draining which can be easily made use of, in this country?

A. Yes, a method by which pine slabs can be used.

Q. How are these slabs laid out?

A. Exactly in the same manner as the pieces of fur: two slabs are laid on the bottom of the ditch or drain, along side one another leaving between them an open space of from two to three inches. These too slabs are then covered with a third one or with a flitch.

Q. What are the advantages derived from the drainage of open ditches in strong soils or mould lands.

A. The advantages offered are the following: 1° a drained soil not being cut by open ditches, can be sowed throughout its entire length and width, 2° the sewering being much more perfect by drainage than by open ditches, it follows that sowing can be done at least a fortnight earlier in the spring and ploughing later in the fall; 3° strong and cold soils

become warmer by drainage ; 4° the ploughing, harrowing and mowing are rendered much easier ; 5° when once this work is done, no repairs are required and the farmer is rid once for all, during his lifetime and that of his children of the keeping in repair of the furrows and ditches.

Q. What is the result of the experience of foreign countries as to the importance of drainage ?

A. The result of this experience shows that drainage doubles and trebles the yielding of farms and that very light soils only, can generally dispense with it.

Q. At what depth should the ditches in which are laid the pipes or other materials for draining purposes to be dug ?

A. At a depth of from three and a half to four feet, when the nature of the soil allows it, and when an outlet for the water can be found.

Manure and Dungs.

Q. What is meant by manures.

A. By manures are meant all the substances which enrich the soil when mixed with it and which supply the elements required by plants for their nourishment.

Q. What are the differend kinds of manure that can be best made use of in Canada ?

A. They are, 1° stable dung, 2° vegetable manure ;

3° ashes ; 4° lime ; 5° plaster ; 6° ground bones ; 7° fish and varec ; 8° slops and all sorts of refuse, human excreta &c.

Stable Dung.

Q. Can the farmer easily increase the quantity and value of the stable dung ?

A. The farmer can easily increase the quantity and value of the stable dung by litters.

Q, What is meant by litters ?

A. Litters comprise all the substances spread under or near the cattle, upon which they lie down, and which are mixed with the dung.

Q. What substances are most frequently used as litters ?

A. They are, straws of all kinds, tree leaves, weeds, ferns, saw dust, tan, swamp soil or strong soil.

Q. What are the most economical litters that can be made use of in Canada ?

A. On account of our long winters and the scarcity of fodder, the most economical litters are swamp soil, strong soil, ferns, tree leaves and saw dust.

Q. In what state should these five substances be made use of ?

A. They should be used as dry as possible.

Q. How are litters employed ?

A. Some of them, as straws, weeds, ferns, rushes, are spread under the cattle for them to lie on. Others, as strong soil, swamp soil, earthy substances, should be spread in the alley behind them ; their sole object being to absorb the liquid part of the dung and to increase its quantity.

Q. What is the action of the litters ?

A. Litters act in different ways : 1° the straw litters, spread under the cattle in sufficient quantity, help to keep them in a high state of cleanliness ; 2° straw litters as well as ordinary earth or earthy substances, hold the urine and the liquid dung ; 3° they increase the quantity of manure and add to its quality.

Q. Are the urines of cattle and the liquid part of dungs of great value ?

A. They are of much more value than the solid parts, and every means should be taken to secure and preserve them.

Q. Besides the use of litters, do you know of any other means recommended for collecting these liquid parts.

A. Besides the use of litters, liquid manure pits are recommended.

Q. What is meant by liquid manure pits ?

A. Liquid manure pits are tanks in masonry,

into which flow the urines and the liquid manure, by means of spouts incased in the floor of instable. Watertight casks are sometimes used instead of these tanks.

Q. What use is made of the liquid manure thus collected?

A. By means of buckets or pumps the hose of which is plunged into these tanks or casks, the dung heaps placed under shelter or heaps of ordinary earth or other substances are watered and are then called composts. In certain countries, sowed fields or gardens are sprinkled with these liquids mixed with a certain quantity of water.

Treatment of dungs.

Q. What is meant by the words: treatment of dungs?

A. By these words is meant all that relates to the preservation of dungs, their carting and their spreading.

Q. What are the best means of preserving the dungs?

A. These means vary according to the seasons. During the winter no inconvenience can result from leaving the manure in the open air, because the snow and frost cannot injure them. But when the heavy spring and fall rains set in, or during the heat and showers of summer, it is of the greatest importance

to protect the dungs from the action of these rains and that of the sun.

Q. By what means can these inconveniences be remedied ?

A. By erecting in front or in rear of the stables, shelters under which the dung is thrown, and to keep it there until it is carted ; or by digging under the stables, cellars in which the dungs are thrown through traps cut open in the alleys.

Q. What is the best time for carting dungs ?

A. When the dungs are to be used on pieces of land neighbouring the stable, they need not be carted until they are wanted ; but if they are to be used on lands at a certain distance from the stable, it is better to cart them before hand, and the best time for this carting, in Canada, is winter, fall or spring.

Q. What care should be taken when carting the dungs ?

A. First of all, the dungs should be thrown into large heaps, of from 25 to 30 cart-loads at least, and these heaps ought to be placed in the neighborhood of the fields on which they are to be used. On the spots where these dungs are to be deposited, care must be taken to construct before hand, platforms of ordinary or swamp earth, several inches thick, upon which the dung should be thrown.

Q. Of what use are these platforms ?

A. These platforms made of ordinary or swamp

earth, retain the liquid which escapes from the dung, and which otherwise would be lost. This earth becomes itself an excellent manure.

Q. If the dungs are to be used in the fall only, what care should be taken ?

If the dungs are to be used only in the fall, they should be thrown into a heap of about four feet high and twenty five feet wide. The sides of these heaps should be as perpendicular as possible, and not in proximity to the roof of the stables that they may not catch the water from the gutter ; they should not be placed on a slope, because the heavy rains might wash away their liquid parts ; and lastly, they should be covered with a coating of ordinary or swamp earth, or of straw or leaves, from three to four inches thick.

Q. Why is this coating of earth or straw used ?

A. It is used, first to protect the dung from the action of the rays of the sun and from the rain, and as the dung ferments during several months, fertilizing gases escape from it, which the coating retains, thus preventing their loss. This coating becomes of itself an excellent manure.

Q. What other modes can be employed to lessen the fermentation of the dung ?

A. The other mode consist in beating it down with shovels, or trampling it.

Q. Wat are the results of beating down the dung ?

A. It prevents the atmosphere from penetrating it, for the less the dung is penetrated by the air the less it ferments.

Q. What principal defects are noticeable in this country with regard to the treatement of dungs?

A. The principal defects in the treatement of dungs are the following: 1º few or no litters are used; the employment of tree leaves, weeds, grass from weeding, ferns, swampy or ordinary earth is neglected, which would have the effect of holding the urines and liquid parts of the dung and would double its quantity; 2º the dung is thrown carelessly in front of the stable and no pains are taken to prepare before hand earth platforms to receive it; 3º the spot where the dung is thrown is often hollow, or is composed of light and sandy soil, so that the rain water in washing the dung carries away the liquid manure that is to say the liquid part of the dung, several feet under the ground; 4º farmers often lay their dung in small heaps on the snow, or on their pastures during the hot days of June and July, so that when the time of burying it has come, it has been all washed, has become spongy and is hardly worth more than straw; 5º farmers are often seen placing large dung heaps in the neighbourhood of ditches or streams, into which all the liquid manure runs.

Different kinds of dung.

Q. How many kinds of dung are there?

A. There are four principal kinds of dung : 1° long, green and straw dung ; 2° rotten or black dung ; 3° cold dung ; 4° warm dung.

What difference is there between the two first kinds of dung ?

A. The long green straw dung is that which has not, as yet, fermented ; the rotten or black dung is that which has grown old and has fermented.

Q. Which of these is the best ?

A. As a rule, dung which has begun to ferment and to rot, is the best.

Q. Are there any inconveniences in allowing the dung to ferment too long ?

A. Yes ; because the dung which ferments too long, loses in consequence much of its weight, its bulk and its value.

Q. In what cases are green or strawy dungs employed in preference ?

A. They are sometimes employed in preference for the cultivation of potatoes, indian corn, turnips, carrots, swedish turnips. In strongsoils, the long or strawy dungs have this advantage over the other others, that they loosen and enrich the earth at the same time.

Q. In what cases is preference to be given to rotten dungs ?

A. Preference is given to rotten dungs in the cul-

tivation of carrots, beets, cabbages &c. and when it is intended to manure an old meadow.

Q. What inconveniences result from the use of green dung ?

A. Green dung has the inconvenience of containing noxious seeds which later on shoot and infest the cultivated lands ; it does not contain, moreover, as many rich fertilizing agents, as the dungs which have begun to ferment.

Q. Does the use of green dung on fields in which vegetables are to be grown, offer the same inconvenience ?

A. No, because the numerous weedings to which these fields are submitted destroy the weeds ; but even in this case, the dungs which have begone to ferment have a much greater value.

Q. Are weed seeds also found in roten dung ?

A. There are no weed seeds in rotten dung, because these seeds are decomposed by the putrefaction of the dung.

Q. What is meant by cold and hot dungs ?

A. Cold dungs are those which ferment and decay slowly and with difficulty ; hot dungs are those which ferment and decay rapidly.

Q. Give illustrations of these two kinds of dungs ?

A. The cow and swine dungs are cold manures, the horse and sheep dungs are hot manures.

Q. Which is the best mode of accelerating the decay of cold manure.

A. The best mode is to mix the cold and warm dungs together.

Green or vegetable Manure.

Q. What is meant by green manure?

A. By green manure is meant the ploughing in of plants still green and blooming.

Q. What are the plants that best suit as green manure in this country?

A. Clover and buckwheat.

Q. How can you produce green manure with buckwheat?

A. Put the seed in the ground at the beginning of June, after having loosened it thoroughly. When the buckwheat would have attained its full size that is, when in full bloom, run the roller over the field to beat down the stalks. Then plough in the buckwheat. (*) When the buckwheat is to be thus used as green manure, it must be thickly sowed.

Q. How would you produce green manure with clover.

(*) Another excellent and simple mode, consists in attaching to the plough by means of a chain, an iron or stone weight, which dragging alongside the mold board, beats down the buckwheat before it is ploughed in.

A. In the same manner as with buckwheat, it ought to be ploughed in when in full bloom.

Q. Which of these two plants is the best fertilizer ?

A. Clover; but a sufficently rich soil is first required to enable it to grow, whilst buckwheat, on the contrary, grows well in poor soils.

Q. What objections have farmers to the use of green manure ?

A. The greatest objection with them, is that they do not like to bury in the earth a crop of buckwheat or clover, which otherwise disposed of, would give them a certain benefit.

Q. Do you not think that this objection is sometimes well founded ?

A. Yes, if the farmer is very poor, and if this harvest is required to satisfy the pressing wants of his family. If, on the contrary, the farmer can do without this harvest, he will find in the long run, that his having ploughed it in, has proved a profit.

Q. How do you account for the benefit arising from the burying of these plants ?

A. After these plants have been buried the field will yield twice or three times as much the following year, and for several years to come.

Q. Does green manure act merely as manure ?

A. Green manure acts also as an improvement; it

loosens strong soils, and when it has become mouldy it gives consistence to light soils.

Lime and liming.

Q. What is to be said of lime as a manure?

A. Lime is one of the principal manures, which should to be employed in this country; 1° because it is necessary to the nourishment of the plants, and 2° because most of our farms are in want of it.

Q. Does lime agree with all sorts of soils?

A. Lime agrees with all soils that do not contain it, and especially with strong and mouldy soils, because it acts upon them not only as a manure, but also as an improvement.

Q. Are there not soils which contain too much lime?

A. They are scarce in this country.

Q. In what state is lime to be used?

A. It ought to be applied newly slacked and well pulverized.

Q. How is lime slacked?

A. It can be slacked in three different manners: 1° by placing the lime under a shed or shelter and allowing it to slacken gradually by the action of the moisture contained in the atmosphere; 2° by placing it under shelter or in the open air and slackening it with water poured on it in small quantities; 3° by

piling it on the ground and covering it with ordinary earth, swamp earth or weeds &c. This is called making composts.

Q. What would happen if the lime was sprinkled with too much water?

A. If the lime was sprinkled with too much water, it would run the risk of being drowned, that is to say, it would not slacken; or, if this water were added after the lime is slackened, the lime would settle into lumps and become a kind of mortar.

Q. How is this lime applied?

A. It can be applied in two different manners: over the seed, or on the land before ploughing.

Q. How would you apply the lime over the seed?

A. The best mode of applying lime over the seed is to spread it with a shovel, when newly slacked, on the seed itself immediately after it has been sown, and then to harrow.

Q. Is lime always easily spread?

A. No, because in order that this strewing be regularly and uniformally done, the weather must be still, or the wind if any, very light. When the wind is strong it carries away the lime.

Q. In what other manner, can lime still be used.

A. Lime can also be successfully used in the following manner; for instance in the ploughing up of

an old meadow covered with moss and weeds ; immediately before ploughing, the slacked lime is spread over the grass and ploughed in as soon as possible. The following fall, before the second ploughing, the liming is again done, in the same manner. If the field is to be ploughed a third time, a third liming should be done.

Q. What are the chief advantages derived from the employment of lime, according to these two methods ?

A. The chief advantages of the use of lime are : 1° to act as an improvement in strong and light soils, when it is used in sufficient quantity ; 2° to destroy weeds and mosses and many insects and noxious animals ; 3° to act as a manure.

Q. What quantity of lime should be used with one or the other of these methods ?

A. In the first method, the quantity of lime to be used, varies from 30 to 50 bushels to the acre.

In the second method 30 or 50 bushels, must be used for each ploughing, that is from 90 to 150 bushels.

Q. What results may be expected from the use of lime according to these two methods ?

A. From the use of lime according to these two methods, crops may be expected three or four times larger than if liming had not been done without

taking into account the fact, that the good effects of this lime are long felt.

Q. Does lime dispense with the use of dung or other manures ?

A. No ; it is indispensable to dung all the soils, and it is an excellent custom to dung the limed soils the year after they have been limed. If the land is a meadow land, the dung is spread as a coating after the first mowing of the grass.

Q. What fields should be limed in preference ?

A. Fields composed of strong or mouldy soils, which are to be converted into meadow lands or pastures.

Ashes.

Q. How many kinds of ashes are there ?

A. There are two principal kinds : leached and unleached ashes.

Q. What is the difference between these two kinds of ashes ?

A. Unleached ashes are in their natural state, that is, as they are taken from the stoves and furnaces ; leached ashes are those which have been used in the making of potash, soap or lye.

Q. Have all unleached ashes the same strength ?

A. The strength and value of these ashes vary according to the different kinds of wood from which

they are made. Thus, the ashes of hard or soft wood have more strength than peat or coal ashes.

Q. What is the manuring value of unleached and leached ashes?

A. Leached or unleached ashes are one of the best manures that can be used, their action being very rapid.

Q. What species of plants do they best agree with?

A. They agree with all plants, especially with wheat, rye, barley, oats, millet and clover.

Q How are these ashes strewn?

A. They are generally strewn with a shovel, after the field has been sown, and when the harrowing is done.

Q. What quantity of ashes is used to the acre?

A. From 30 or 60 bushels are used to the acre, according to the strength or value of the ashes, and according to the results to be obtained.

Q. In what cases would you recommend the use of ashes?

A. I would recommend it especially on fields that are to be converted into meadow land, and I would spread them over these fields, immediately after having sowed them with millet and clover seed, and after the harrowing.

Plaster or Gypsum.

Q. With what kinds of plants does plaster agree?

A. Plaster agrees especially with clover, peas, tobacco, cabbage, hemp, flax, and buck-wheat.

Q. What is the effect of plaster on cereals, such as wheat, barley, rye &c ?

A. Its effect on these plants amounts to nothing or next to nothing.

Q. How is plaster used ?

A. The best manner of using plaster is to spread it on the leaves of the plants when they have sprouted. It is preferable to do this spreading when the leaves are moist, as for instance, in the morning when the dew has fallen or after a light rain. With regard to peas however, it is better to roll the seeds in the plaster after they have been moistened. This method is productive of excellent results. The plaster thrown over the stalks of peas is sometimes injurious, causing them to grow too luxuriantly.

Fish, Varech.

Q. In what parts of this country are fish and varech used as manure ?

A. They are used as manure, chiefly on the coasts of the lower St. Lawrence, where they are found in abundance. They compose precious manures which the farmer should make use of, whenever they can be found. They agree as well with grain as with vegetables.

Slops, Sweepings &c.

Q. How can slops and sweepings be utilized as manure?

A. A good farmer ought always to have, at a certain distance from his house, a heap of ordinary or swamp earth, on which he causes the slops and refuse of the farm to be thrown, scrubbing and kitchen water, suds of all kinds, urines, sweepings, soot, &c.

Q. Do you know of a good process for preventing these heaps from emitting a bad odor?

A. Yes; this process consists in throwing over them now and then, a few shovelfuls of earth. By this process the heaps increase rapidly and emit no bad odor.

Q. Are these heaps of earth when impregnated with all these substances, a good manure?

A. They make an excellent manure which the farmer should always make use of; he loses several dollars a year by failing to do so.

Chemical manures.

Q. What is meant by the words chemical manures?

A. By these words are meant certain artificially manufactured manures, intended, partly or wholly, to replace ordinary manures and especially stable manure.

Q. Which of the chemical manures is now most appreciated ?

A. The most highly appreciated of all, is the superphosphate of lime, which is prepared from ground bones and oil of vitriol.

Q. Are these manures of great value to-day ?

A. These manures have now a great value, and are becoming more and more valuable.

Adaptation of seeds to soils.

Q. Do all sorts of soils agree equally well with all kinds of seed ?

A. No ; each variety of soil suits one or another kind of seed, and agrees little or not at all, with others.

Q. What kind of seeds are better sown in strong or mouldy soils ?

A. The seeds better sown in strong or mouldy soils, are chiefly, wheat, peas, indian corn, oats, barley, and certain vegetables, such as beets, turnips, carrots, swedish turnips, cabbages, &c. These soils are best suited for clover and millet, and should be converted into meadow land as soon as possible.

Q. Is the preparation of the land the same for all these seeds ?

The preparation of the land is not, in any way, the

same for the sowing of these different kinds of seed. While, oats grow very well in a strong soil not much loosened, barley on the contrary, and all the vegetables, will only grow well in these soils, if they have been perfectly loosened.

Q. Give illustrations.

A. After a single ploughing on a meadow composed of strong soil, oats will give a good yielding ; to obtain on the contrary a good crop of barley or vegetables on the same field, it must have been ploughed several times beforehand, repeatedly harrowed, and the soil must have become rotten.

Q. What are the seeds best adapted to light soils ?

A. These seeds which are best adapted to light soils are chiefly : rye, buckwheat, peas, beans, and barley, and among vegetables : potatoes, carrots, swedish turnips, &c.

Q. Are light soils suitable for meadow lands ?

A. They are not as suitable as strong soils for meadow lands. They will produce clover and millet, only, if they are well manured. The meadows last less, and require frequent dressings of manure.

Q. What are the principal defects observed in this country with regard to the adaptation of seeds to soils ?

A. A great many farmers incur annually a considerable loss of time, manure and money, for the

only reason that they sow seeds in soils which are not adapted to them.

Q. Give some illustrations?

A. Some try to cultivate beets, wheat or oats in too light and sandy soils ; barley in poor soils, or soils that have not been sufficiently loosened &c. Others strive in vain to grow hay in dry soils, when they have at hand fine fields of strong or mouldy soils, which it would require very little care to convert into lasting and good meadows.

Sowing and harvesting.

Q. What care should be taken in the selection of seeds?

A. The greatest care must be taken in the selection of seeds, and the best seeds ought to be used.

Q. What may be expected when bad seeds are sown.

A. A poor crop must be expected, the bad seeds put in the earth are lost, because they do not shoot.

Q. What is the most common defect in this country, with regard to sowing ?

A. Not to speak of the little care given to the selection of the seeds, the most common defect is, that the seed is too thinly or too thickly sown.

Q. What seeds should be thickly sown ?

A. The principal seeds which should to be sown

thickly are: wheat, oats, barley, rye, millet and clover.

Q. What seeds should to be thinly sown?

A. The seeds that should to be thinly sown are: buckwheat, the vegetables which should be sufficiently spaced.

Q. Should the quantity of seed to be sown vary according to the quality of the soil?

A. Yes; in well manured soils the seed should be thinner; in less manured soils the sowing should be thicker.

Q. What quantity of wheat ought to be sown on an acre of good land?

A. About a bushel and a half?

Q. What quantity of barley?

A. From a bushel and a quarter to a bushel and a half.

Q. What quantity of oats?

A. From two bushels and a half to three bushels.

Q. What quantity of buckwheat?

A. From half to three quarters of a bushel.

Q. What quantity of millet and clover?

A. The quantity of millet must be one quarter of a bushel, mixed with two pounds of red clover. Some farmers add profitably twelve pounds of clover to the millet.

Q. What signs indicate that the time has come to reap the wheat, barley, oats, rye and buckwheat ?

A. All these kinds of grain, except those which are set a part for sowing purposes, must be cut a short time before they have fully ripened. Thus wheat is ready to be cut when the grain having past the milky state, is however sufficiently soft to be marked with the finger nail. In this state the straw is still green near the points. All the other kinds of grain must also be cut before they are completely ripe. The grain when cut a little green has more weight and bulk.

Q. What inconveniences result from cutting the grains too late, when they are too ripe ?

A. The grains shed, and a large quantity of grain remains on the ground and is lost.

Q. What are the precautions to be taken after the wheat, rye and barley have been cut ?

A. The wheat, the rye and the barley should be sheafed and bound immediately after they have been cut and built up in shocks or stooks.

Q. How are these shocks built ?

A. A sheaf is first set up on its stocks, the ears uppermost. Around this first sheaf, four others are set up slightly inclined so as to rest on it, the ears being also uppermost.

These sheaves should not have more than three feet in circumference measured on the tie, otherwise

the inside part might ferment over these five sheaves, and this large sheaf is placed with its ears downwards and the shock is ready.

Q. Do you know of any other way of building these shocks or stooks.

A. Another way much in use, is the following : two small sheaves are placed together so that their top may rest on one another ; their lower part being about ten inches apart. Ten of them are thus placed in two rows giving them as much stability as possible. These ten sheaves are then covered with two others carefully laïd down on the shock and acting as a cap.

Q. What advantages are derived from the use of these shocks ?

A. These advantages are manifold ; the grain so arranged can remain out doors during many weeks, in all kinds of weather, without being in the least damaged. Moreover, the grain so arranged continues to feed and to ripen.

Q. Is it also necessary to set up oats in stocks ?

A. No ; because the oats do not shoot easily and can stand a good deal of bad weather before being damaged ; but wheat, rye and barley, shoot so easily and rapidly that they ought always to be set up in stooks, as the cutting goes on.

In rainy seasons the only way of preserving even oats, is to set it up also in stooks. The straw

from grain built up in stooks is of a much better quality and contains more nourrishment for the cattle than that which has been left lying on the field during several days.

Cultivation ef Vegetables.

Q. What are the principal vegatablés cultivated in Canada ?

A. The principal vegetables cultivated in Canada are : potatoes, turnips, cabbages, carrots, beets, sweedish turnips etc.

Q. What soil is best suited for the cultivation of potatoes ?

A. The best soil for the cultivation of potatoes, is a light, sandy or loamy soil.

Q. What is your opinion on the cultivation of potatoes in strong or good soils ?

A. These potatoes are often watery and apt to rot rapidly: however, they can be used with advantage for fall manures, or for feeding the cattle in the stable up to mid-winter. In strong drained soils the potatoes are excellent and yield abundantly.

Q. In what kind of soil are turnips, carrots, beets and cabbages generally cultivated ?

A. The object of the cultivation of these vegetables being generally to prepare the soil for the growing of grain and the making of meadows, they are best cultivated in a good or medium strong soil.

Q. Do the various works necessary to the preparation of the soil for the cultivation of these vegetables, greatly differ ?

A. They are the same for all of them.

Q. What do these preparatory works consist in ?

A. These works consist in deep and frequent ploughing and numerous subsequent harrowings and rollings, so that the earth may be well loosend and pulverized. The fields where these vegetables are to be grown, should also receive a thorough dunging.

Q. Supposing you wanted to sow vegetables in an old and decayed meadow land, what preparotory works would be required.

A. The first thing to be done would be a first fall ploughing, as deep and as properly done as possible. The following spring, this meadow land should be sown with oats or wheat. The next fall a new deep ploughing should again be done and the next spring, one, two or more ploughings with as many harrowings and rollings as the strength of the soil requires. When the soil is completely loosened, the field is prepared for sowing and manuring.

Q. Do you know of any implement which answers advantageously as a substitute for the plough, to loosen the soil after a first ploughing ?

A. This implement is called a scarifier. It brings

up to the surface of the earth, all the weeds which being then exposed to the sun, soon perish.

Q. What quantity of dung is required per acre, for the cultivation of vegetables ?

A. This depends on the nature of the soil and its fertility. Sometimes thirty cart loads are sufficient, but sixty or more are often required.

Q. What kind of dung is generally used for this purpose ?

A. Winter dung is generally used ; if it has begun to rot before being used so much the better.

Q. What is next to be done ?

A. Two different methods are then followed, according as the seed is sown, or the vegetables themselves have been transplanted, after they have sprouted in the hot beds.

Q. Can all these vegetables be planted out ?

A. The cabbages and swedish turnips are transplanted ; ordinary turnips, carrots are sown for good and all ; beets are either sown or transplanted.

Q. Is there any difference between the sowing of turnips and that of carrots and beets ?

A. The manner of sowing these three kinds of seed is the same.

Q. How is this sowing done ?

A. It is done in rows or broadcast.

Q. Which of these two methods is the best ?

A. The best method is that which consists in sowing in rows. The broad cast sowing should be completely left aside.

Q. How is the seed sown?

A. The seed is distributed by hand or in preference, by means of small cheap implements called drills.

Q. Describe the manner of sowing by hand?

A. Take a sharp wooden pin or a piece of wood set with several of these pins spaced ten inches apart from one another; by means of this pin or piece of wood set with pins, holes about an inch deep are made in the beds. These holes should be made at a distance of 10 inches from one another. The holes are then filled up and the seeds buried with the hand or with a rake or a piece of wood drawn over the beds.

Q. What is the inconvenience of this method?

A. This method is a slow one, causes much loss of time and does not give an even sowing.

Q. How many kinds of drills are there?

A. They are of two kinds : the wheel barrow or hand drill, and the horse drill.

Q. Which of them is best suited for ordinary use?

A. For ordinary use, the hand drill is the best.

Q. Give a description of the hand drill?

A. This drill consists of a small wheel barrow

containing a box in which the seed is placed and a small colter or drill which marks on the ridges the lines where the seed is to be deposited. When the seed box has been filled it requires but to run the drill over the ridges, the lines are drawn and the seed drops in mechanically, in the desired quantity and at proper distances. All these results are obtained by means of a small apparatus placed inside the drill; the seeds are covered by the action of the drill itself.

Q. How much time do the different seeds require to shoot ?

A. The time necessary for their shooting varies a good deal with their different kinds. Thus, while the turnips shoot out of the earth 9 or 10 days after they have been sown, carrots, very often, only sprout after 30 or 40 days.

Q. When the turnips have sprouted what care do they require ?

A. As soon as the turnips have sprouted and have four small leaves, a first weeding should be done.

Q. How is the weeding done ?

A. The weeding is done either by hand or by means of hoes, scrapers, &c., or better still, with a cheap implement called a horse hoe.

Q. Why is the horse hoe to be preferred ?

A. It is to be preferred because it will weed and loosen an acre of vegetables, in less than a quarter of

a day. The oftener this loosening is repeated the larger will be the crop. Good farmers use the horse hoe as often as four times on the same field, with the best of results.

Q. Does the horse hoe work on the lines where the turnips have grown ?

A. It does not work on these lines ; the weeding there must be done by hand, or with a kind of scraper named hand hoe.

Q. While the weeding is in process on the lines, what else is to be done ?

A. While the weeding is done on the lines, trimming ought to be proceeded with, that is, that all the shoots in the same hole, except one, the healthiest, should be pulled out. This trimming is often done by hand, but an experienced person can do it very well with the hoe.

Q. What is next to be done ?

A. A fortnight or three weeks after this last weeding, a second one is done, if necessary, to destroy once more the weeds which may have grown in the meanwhile. When the leaves are well developed and cover the whole of the ground, no more weeding is necessary and the vegetation is allowed to go on until harvest time.

Q. If, during the first weeding, you notice that the shooting of the seeds is deficient in certain places, what should be done ?

A. The vacant spaces should be deeply stirred and new seeds sown therein ; this can be done until nearly the end of July.

Q. When should the turnips be gathered ?

A. The turnips which in this country should be sown between the 10th and the 20th of July, are ready to be gathered at the end of October.

Q. How are turnips uprooted ?

A. The are generally uprooted by hand.

Q. How are turnips preserved ?

A. They are preserved in different manners, sometimes in cool cellars, and sometimes in silos, that is to say, by covering them with earth.

Q. Of what use are turnips ?

A. Turnips are sold, or more properly used as food for the animals.

Q. In what manner should the soil be prepared for the cultivation of Swedish turnips ?

A. Exactly in the same manner as for the cultivation of turnips.

Q. Do they require any particular care ?

A. The care which they require is exactly the same as for turnips, with this exception, that they can be sown from the 1st to the 15th of June, or be transplanted.

Q. How is this transplanting done ?

A. It is done exactly as the transplanting of cabbages, during rainy and cloudy weather, in preference, and the plants are placed 10 inches apart.

Q. When should swedish turnips be planted.

A. They should be planted towards the latter end of May or the beginning of June.

Q. How are they preserved ?

H. They are preserved in the same manner as turnips. They have over these latter the advantage of heating with less facility, and can be kept easily during the whole winter.

Q. At what time should beats, carrots and turnips be sown ?

A. As soon as the soil is dried in the spring. The fields on which they are to be cultivated, should have been cleaned and loosened the year previous.

Meadows.

Q. Is the preparation of meadows of great importance ?

A. Yes ; because the farmer who has numerous and good meadows and who harvest's a great deal of hay, is always in easy circumstances and even rich.

Q. What are the soils best adapted for meadows ?

A. The soils best adapted for meadows are strong or good soils. Light soils cannot be converted into

meadow lands without much manuring, and even then, do not last very long.

Q. By what process would you make a good meadow ?

A. The first thing to be done is to select a suitable piece of land, that is one composed of strong or good soil, or of good light soil, and then to drain it thoroughly by digging ditches, if sewerage is not prefered. This being done, two different courses are to be resorted to, according as the land is to be prepared by plowing only, or prepared by the cultivation of vegetables.

Q. Describe the method of preparation by ploughing only ?

A. If the piece of land which is to be dressed is an old meadow covered with moss, and used up, the first thing to be done is a good fall ploughing ; the next spring oats or wheat with millet or clover should be sown, and a thorough harrowing ought to follow.

Q. What do you think of this method ?

A. This method is by far the most economical, because it requires little work and no manuring. In excellent and naturally fertile soils, this method suffices to make pretty good meadows which may last for five or six years. It is a method which can be made use of by very poor farmers, having little or no manure and no means of purchasing any. The

great inconvenience attending this method is that the weeds will soon grow.

Q. Can you improve cheaply on this method ?

A. Yes, by the use of one or the other of the two processes of liming; the meadow will then yield more abundantly and for a longer period.

Q. Can the farmer who has on hand thirty or forty cart loads of dung, utilize it to increase the yield and the duration of the meadow by following this method ?

A. Yes, and what is best to be done in this case, is to allow this dung to rotten, taking into consideration the precautions above mentioned. As soon as the grain has been harvested, the dung should be evenly spread over the meadow, and the millet and clover will soon be seen to grow with renewed vigor. If the dressing cannot be given the first year it should be given the second or the third year, providing however the soil be not too compact.

Q. Can the dung be spread as a coating on all kinds of soils ?

A. Dung as a coating has only good results on well loosened soils; on too compact soils the liquid part of the dung cannot penetrate them and escapes in the furrows, drains and ditches.

Q. How would you prepare meadow land by the cultivation of vegetables ?

A. To prepare meadow land by means of vegetables, the same process is adopted as that mentionned above with regard to their cultivation. The spring following the harvest, the field is ploughed, sowed with barley, oats or wheat, mixed with millet and clover.

A meadow so prepared has a very luxuriant growth, yields from three to four hundred bundles of hay per acre, and lasts seven eight and ten years.

Q. What objections are met with in the preparation of meadows, especially when the soil has not been prepared before hand by the cultivation of vegetables ?

A. The objections are first, the difficulty of ploughing, of harrowing and rolling under good circumstances, because these different operations having to be done early in the spring or late in the fall, the excessive moistness prevents their being properly done; moreover by the cultivation of vegetables the soil is much better loosened and above all better cleared of all kinds of weeds.

Q. Do you know of an economical process to obviate these inconveniences.

The method of obviating these circumstances and which at the same time produces fine and good meadows, is the method called the fallow method.

Q. Describe this method

A. If an already old and worn out meadow is to

be prepared by the fallow system, the first thing to be done is to grow one or two grain crops on it, by means of fall ploughings as stated above. After the second crop of oats, a new fall ploughing is done, and the third spring the field is harrowed but not sown. During the dead time of summer and until the month of August, the field ought to be ploughed anew, often stirred harrowed and rolled.

Q. What is the object of all these ploughings, harrowings and rollings?

A. Their object is 1° to thoroughly loosen the earth; 2° to destroy all the weeds, which being laid bear as they grow, are exposed to the action of the sun which destroys them.

Q. What next should be done?

A. After the last ploughing, about the beginning or the middle of August, the field should be sowed with millet and clover, in the proportion of a quarter of a bushel of millet to two pounds of clover at least per acre, well mixed together. The seed is buried by harrowing. If before sowing the seed, the farmer can afford to lime the field, or if he can spread directly over the seed a coating of from 20 to 30 cart loads of rotten dung, he will be sure of making a first class meadow which will last a very long time.

Q. What is your opinion of the value of all these methods?

A. The first method with a single ploughing and no coating, and that of the fallow system without liming and coating, are only fit for farmers that are too poor to dispose of a few cart loads of dung or spend a few dollars in the purchase of 5 or 6 barrels of lime; and there are few cases of this kind. The first method with liming or dung as a coating, and the method of the fallow system with liming or a dung dressing, are probably the best to be employed for a great number of farmers who are beginning to improve their farms and who have not much manure on hand. But as soon as time and means will allow to cultivate the vegetables, and as soon as the knowledge of the benefit to be derived from this cultivation shall have spread sufficiently, the farmer must hasten to cultivate an acre of vegetables at least every year.

Q. What care do meadows require when once they are made ?

A. The first care to be given to meadows once they are made, is to see that the drainage is perfect. To this effect, care must be taken every fall to see that the furrows the drains and the ditches are well cleaned, and that nothing interferes with the escape of the water.

Q. What is the effect of the continuance of water on the meadows ?

A. The result is disastrous on account of the frost.

Q. What is the proper time for cutting the hay ?

A. The best time for cutting the hay is when the flowers of the millet begin to drop. Those having much hay to cut, should commence a little earlier

Q. What are the principal defects to be noticed, in Canada, in the preservation of meadows ?

A. They are numerous ; 1° in many districts the meadows have become too old and have not been ploughed for 16, 25 and even 40 years ; 2° these meadows being covered with moss and weeds, do not yield more than a few loads of poor hay ; 3° the furrows drains and ditches are not taken care of, so that the water continues on the meadows and destroys the roots of the grass ; 4° the grass is only cut when it is too ripe and the hay having dropped all its seed, is not worth much more than straw.

Pastures.

Q. Is it important to have good pastures ?

A. It is very important to have good pastures ; because it is not only necessary to keep the cattle in good condition during the winter, but also to feed them well during the summer.

Q. How are pasture lands prepared ?

A. Pasture lands must be prepared in the same way as meadow lands ; the fields which have been kept as meadows during several years, make good pastures.

Q. What are the principal defects te be observed with regard to pasture lands in this country.

A. The pasture lands in this country are generally poor. This arises from the fact that the farmers do not give themselves the trouble of sowing them with millet and clover and that our pastures are generally nothing else but the stubbles of the last year.

Q. What would be the advantages derived from the sowing of pastures with millet and clover.

A. These advantages would be, that the grass being much thicker, the farmer would not have to use as pastures as extensive tracts of lands as he now does ; moreover the cattle having a more abundant food would prove more profitable.

Q. Are there sufficient good meadows and pastures in the Province of Quebec.

A. No, any good farmer, who wishes to acquire wealth, should keep at least half of his farm in meadows and pastures. (*)

Stock or Domestic Animals.

Q. What are the principal domestic animals reared in this country ?

(*) A very good methood of securing abundant food for the cattle, even when the pastures are dried up by the hot weather, consists in sowing near the stables on the pastures, lentils or indian corn on a small piece of land well prepared and well manured. When the grass gives out, the quantity of food necessary for the cattle is cut from it and the bad effects of the draught are thus remedied.

A. The principal domestic animals reared in this country are horses, cows, swine, sheep and poultry.

Q. In what manner can the greatest profit be derived from the rearing of domestic animals.

A. By feeding them abundantly the whole year long, by giving them all the care they require and by keeping those only which can be properly cared and attended to.

Cows.

Q. What quantity of milk should a good cow give ?

A. A good cow should give at least two and a half to three gallons of milk, and ought to do so for ten or twelve months if properly fed. This milk ought to be white and yield a sufficient quantity of cream.

Q. What quantity of milk do the best cows yield on an average.

A. The best cows yield from four to four and half gallons of milk. Some yield as much as from five to six gallons, but they are seldom to be met with. The cows that yield the greatest quantity of milk are not always the best, for it sometimes happens that this milk when very abundant is of a poor quality, and does not yield much cream.

Q. How is the quality of the milk generally tested ?

A. It is generally tested by its colour ; rich milk is of a white color, poor milk is blue.

Q. What are the foreign breeds of cows best suited for this country ?

A. According to good judges, the foreign breeds best suited for our climate are : the Ayrshire and Alderney.

Q. What do you think of our canadian breed ?

A. There are excellent cows of Canadian breed when they are chosen with care. Cows half Ayrshire and half Canadian are very good.

Q. What particular care do cows require ?

A. During the summer season they should have good pastures and plenty of water. They should also be well fed during the winter and be kept clean.

Q. How should cows be fed in the stable ?

A. Cows should be fed in the stable on good hay and straw, and be given once a day at least, either vegetables, bran mash or other porridge.

Q. What vegetables are best used as food for cows ?

A. Beets, carrots, swedish turnips, turnips, potatoes, &c.

Q. What precautions should be taken before giving these vegetables to the cows ?

A. Care should be taken to cut them in slices or in small pieces ; if this is not done, it sometimes happens that the cows swallow too large pieces and are choked.

Q. How are these vegetables cut ?

A. They are cut with knives or chopping knives or better still with an instrument called a root-cutter.

Q. Do you think it is very important to feed the cows once a day on vegetables ?

A. Yes, it is very important. This meal composed of vegetables is the surest means of keeping the cows in good health, without taking into account the fact that cows give more milk and retain it much longer.

Q. What do you mean by the words : to keep the cows in a state of cleanliness ?

A. I mean that the cows should be cleaned every day and have enough room in the stable to breathe pure air and that they should be curried now and then.

Q. Is it important to milk the cows carefully ?

A. Yes, care must be taken to strip the bag completely, because if the least quantity of milk were left in it, the yield would greatly diminish ; they should also be milked at regular hours, always be treated with kindness, quietly, and be kept in a state of extreme cleanliness.

Swine.

Q. What is your opinion of the value of our Canadian swine ?

A. The breed of our Canadian swine is a very inferior one, and has universally degenerated. They eat a great deal and fatten slowly.

Q. What are the principal foreign breeds introduced in this country ?

A. The principal foreign breeds introduced in this country are : the Suffolk, Berkshire, Yorkshire, Essex, White Chester &c.

Q. What are the advantages of these foreign breeds over our Canadian swine ?

A. They are much more easily and rapidly fattened, although they eat much less.

Q. Which is the best season to fatten swine ?

A. The best season is summer and the beginning of fall ; first, because these animals fatten much better during warm weather ; secondly, because during the summer, they can be mostly fattened with the milk of the cows.

Sheep.

Q. What is your opinion with regard to our breed of Canadian sheep ?

A. Our breed of sheep, like that of our swine has become degenerated and must be renewed.

Q. Which are the foreign breeds best adapted to this country ?

A. After a great many experiments, judges seem to

agree in stating that the breeds known under the names of Cotswold, for long wools, and Southdown for short wools, are the best.

Q. What care do sheep require in the pen ?

A. Sheep should be kept cool and dry. The door of the pen should be left open most of the time during the winter, except in very cold weather ; a wise precaution is to put up a fold in front of the pen, where they can come out in the open air when ever they choose.

Q. What food best agrees with sheep ?

A. The food which best agrees with sheep is clover, hay, haulm, and from time to time lentil in small quantities; if they can also be fed on vegetables once a day, they will yield more wool and will enjoy better health.

Q. When should the farmer think of purchasing improved stock ?

A. The farmer should only think of purchasing improved stock, when he is certain that the produce of his farm will be sufficient to feed them well and keep them in proper condition. Thus, he must not think of breeding or purchasing improved cows, until his meadows can give a sufficient yield to allow him to give them an adequate supply of good hay for the winter, and until his pastures are good enough to allow them to feed abundantly during the summer

Q. What will happen if improved animals are not well fed and kept in good condition?

A. They soon degenerate and lose all their value.

Agricultural Implements.

Q. Enumerate some of the new or improved agricultural implements, which are not expensive, and which an intelligent farmer ought to own?

A. These implements are mowers, reapers, raking mowers, horse rakes, and a very handy although mostly unknown implement called the sheaf-binder. Those who cultivate vegetables (turnips, swedish turnips, &c.) ought to purchase a drill barrow and a horse hoe. For the destruction of weeds (quitch grass, daisies, &c.), the extirpator or cultivator it is a most precious implement. It also serves to loosen the soil deeply and to bury pea seeds. It is an excellent substitute for the plough in fallows (summer ploughing), and should be in use on every farm.

Rotations.

Q. What does rotation consist in?

A. Rotation consists in the successive cultivation of different plants in the same field, in order to draw from the soil the greatest quantity of produce at the lowest cost.

Q. What is meant by the words: successive cultivation of different plants?

A. These words mean that, with few exceptions the same seed or seeds of the same kind should not be sown two or three years consecutively in the same fields.

Q. What inconveniences result from sowing the same seeds, two or three years consecutively on the same field.

A. The principal inconvenience is that the seed finds no longer the nourishment it requires

Q. Explain why the seed does not find the nourishment it requires ?

A. It is an established fact that each kind of seed takes from the soil a certain quantity of the nutritive elements which it contains ; it is also well known that these nutritive elements are of various kinds and that they are not taken up equally and in the same proportion by the different plants. Thus, for instance, while certain plants take from the soil much lime and a small quantity of its potash, others on the contrary take much potash and little lime, etc. It is evident from this that if the same seed is sown for two or three consecutive years in the same field, it will eventually not find a sufficient quantity of the nourishment it requires.

Q. Give some illustrations.

A. Wheat should not be sown two consecutive years in the same field, neither barley nor rye, nor vegetables etc.

Q. Are rotations very numerous ?

A. Rotations are very numerous and vary according to the quality of the soil and different climates.

Q. What rotations best agree with strong or mouldy soils, in this country.

A. The rotation which best suits such soils is that which allows them to be thoroughly cleared and to give the largest hay crop and the best pastures, so as to feed and keep the greatest number of animals.

Q. Give some illustrations.

A. These illustrations have been given already (page 54) when speaking of the preparation of meadows : 1° by ploughing only ; 2° by the cultivation of vegetables, 3° by fallows.

Q. What defect is noticeable in this respect in this country.

A. The principal defect noticeable in this country, is that in many localities there is no rotation at all. Farms are cultivated at random, and without discrimination. A field is set apart for peas, and is always sown with peas, another for wheat, and so on.

Q. What is the result of this practice ?

A. The result of this practice, is that the soil becomes exhausted, and its owner is ruined.

Methods of Cultivation.

Q. What method should the Canadian farmer adopt ?

A. The Canadian farmer should adopt the method of converting as soon as possible and as perfectly as time and his means will allow, as great a part of his farm as possible into meadow lands.

Q. Why should the farmer seek to convert the greater part of his farm into meadow lands ?

A. For several reasons ; first, because farms in this country are very extensive and manual labour is becoming scarce ; secondly, the summer season being very short, the farmer above all ought to try to reduce the amount of labour to be done.

Q. How does the cultivation of hay enable to reduce the amount of labour ?

A. Because meadow lands once well prepared do not require any ploughing in the fall, nor sowing in the spring, except when they have become old and when the time has come to plough them up. They do not demand any other work, but that of mowing and the gathering and storing of the hay.

Q. What other advantage does this method offer ?

A. This method allows to harvest a great deal of hay, and with a large quantity of hay a great number of animals can be kept in good condition. These animals give large profits and besides a great quan-

tity of manure. Manure is so essentially the basis of all good farming, that it is generally remarked with a good deal of truth, that dung is the capital of a farmer.

Farmer's Book-keeping.

Q. What is book-keeping ?

A. Book-keeping is the art of keeping accurate accounts. It consists in recording regularly in books the amounts of expenses, losses and profits realized.

Q. Is book-keeping of great importance to the farmer ?

A. Book-keeping is as important to the farmer as it is to the merchant; for without it he cannot ascertain whether he is growing rich or poor. A great many farmers are ruining themselves without being aware of it, from their keeping no accounts.

Q. What other advantage results from regular book keeping ?

A. Regular book keeping is one of the best means of learning how to practice economy; because when one always exactly knows what he owns and what he owes, he is more on his guard, and is less apt to run into debt and into extravagant expenses.

Q. Should a good farm book keeping confine itself solely to the recording of expenses and gains and profits in cash ?

A. A good farm book keeping should comprise all the operations regarding cultivation, in other words, all the expenses and all the gains or receipts in cash in produce and in labor.

Q. Give an illustration.

A. Suppose I wish to make out the account of the expenses to be made to renew an old and exhausted meadow, and that of the gains and profits which it will yield; on one of the pages of the book headed: "Expenses", which is intended for this field and which I call No 1, I write down:

FIELD No. 1.

1874.		$	cts.
Oct. 15 & 16	Ploughing; two men and two horses during two days, dit-		
1875.	ches, furrows, etc.....	*so much.*	
May 15	Harrowings, sowing, rolling, ditches, furrows, &c.....	*so much.*	
"	Cost of seeds for sowing.....	*so much.*	
August 1st	Mowing the grain, binding, storing.....	*so much.*	
Oct. 20	Threshing and winnowing of the grain (so many hours or days)	*so much.*	
Dec. 3	Cost of a trip to town for the sale of grain (boat, cart, board, &c.)	*so much.*	

In summing up the above expenses, I find the exact amount which this field has cost in cash, or

in labour (which amount's to the same thing) for this first year.

Q. How would you keep an account of the profits derived from this field?

A. Opposite the page headed "Expenses," I set apart another page which I head "Revenue" or "Receipts" and I write thereon:

FIELD No. 1.

1875		$	cts.
Dec. 3d.,	Sale of many bushels of grain, gathered from field No. 1	*so much.*	

Q. What would you do the following years?

A. The following years, I would keep the same accounts for the same field and for the other fields of my farm, during the whole period of rotation.

Q. Can one always make out exactly the expenses and profits of a field after the first or second year?

A. No; generally these expenses and profits can be made out only after the seventh or eighth year. Because, very often, the higher the costs of improving the field will have been during the first and second year, the larger the profit will be in the following years.

Q. Suppose you do not sell the produce of your farm, but that they be consumed by your familly or the cattle on your farm, how will you then estimate heir value?

A. In this case, I sell this produce to myself and I value it at current rates as if I was selling them to another person. Most times it happens that this produce consumed by the cattle of the farm yield more in milk, chese, meat, butter, dung &c than if they had been sold in their natural shape.

Q. Would you also keep an account of the purchases made from the merchants in cash or on credit ?

A. Yes, and I shall always keep an exact list of all these purchases, especially of those made on credit. Running over this list frequently reminds one of his debts and prevents contracting new ones.

Q. Do you not think that all these details require much writing and cause a loss of precious time.

A. No time can be better employed than in keeping one's own books. Once this habit is formed, very little time is required to do all the necessary calculations and writing; on an ordinary farm it will take about a quarter of an hour every day. Moreover, in keeping an account of every thing, one learns arithmetic and he who calculates oftenest and best, stands the best chance of becoming rich. In a word the young farmer fresh from school who would take the habit of keeping accounts, would not forget how to write, which often happens nowadays.

GARDENING

OR

HORTICULTURE

Q. What is meant by the words : gardening or horticulture ?

A. These two words have the same meaning, that is to say : the art of cultivating gardens.

Q. What is a garden ?

A. A garden is a small piece of land in which vegetables, flowers, and certain fruit and ornamental trees are cultivated.

Q. Under what names are these different kinds of gardens designated.

A. These different kinds of gardens are called vegetable or kitchen gardens, fruit gardens or orchards, ornamental or landscape gardens &c.

Q. Which of these gardens are the most important for the Canadian farmer ?

A. The vegetable or kitchen garden and the fruit garden or orchard.

Q. Are vegetables alone generally grown in the vegetable or kitchen gardens, in this country ?

A. In the kitchen or vegetable gardens of this country, not only vegetables are grown, but also certain fruit trees and flowers.

Q. What do you think of the value of a vegetable or kitchen garden ?

A. It is the best of all for a Canadian farmer, and that which ought to be recommended above all.

Q. What name would be most appropriate for this kind of garden ?

A. The most appropriate name would be "the useful garden."

Q. What is the object of this garden.

A. The object of this garden is to gather from the soil, in a limited space, the quantity of vegetables and fruits best suited to the diet of man and the preservation of his health.

Soils suitable for gardening.

Q. What kind of soils are best suited for horticulture or gardening ?

A. Light sandy soils or good light soils are best suited ; but, all soils, with proper dressing can be adapted to gardening.

Q. What is to be done, when a garden is to be made in a too sandy or marly soil ?

A. The first thing to be done is to improve the land.

Q. How is this improvement done ?

A. This improvement is done in the same manner as for large farming. (*) On overstrong or marly soils, sand, crushed loam or any other substance which loosens the earth ought to be carted ; swamp earth or mould should be added to over sandy or overlight soils.

Q. Is it very important to improve the soil intended for gardening ?

A. Yes, because if the soil has not the required physical properties, in other words, if it is not well improved, the gardening will yield but little or poor products.

Q. Besides the mixing of the different kinds of soils with one another, or with mould, what other means has the gardener at command for improving the soil ?

A. The gardener can resort to deep and frequent spadings, especially in the fall, sometimes to ploughings and especially to drainage in strong, low and moist soils.

(*) See Manual of agriculture, part first.

Dimensions and division of the garden.

Q. What should be the divisions of the useful garden in this country ?

A. Useful gardens whose object is to supply the wants of a family, should have dimensions proportionnate to these wants, to the quantity of dung or manure which is on hand and to the time which can be devoted to its culture.

Q. Is a large garden always profitable ?

A. Very often a large garden gives less profit than a small one, because all the time and care it requires cannot be given to it.

Q. What is the ordinary plan adopted for vegetable or useful gardens ?

A. The most usual plan is that of a square, more or less perfect, because this shape permits the division of the garden with greater ease and economy.

Q. When the site and dimensions of the garden have been agreed upon and the soil properly improved, what is next to be done ?

A. It ought to be fenced in properly, so as to protect it from the trespassing of animals and thiefs, and for this reason the garden should always be in the neighbourhood of the farm house, so that it can be easily guarded.

2. How is a garden divided ?

A. A garden is divided into squares, beds, borders, large and small alleys.

Q. What is a square bed ?

A. A square bed is a piece of ground more or less extensive on which vegetables are cultivated.

Q. How is a square bed divided ?

A. A square bed is divided into beds, or simply by lines.

Q. What is meant by the word bed ?

A. A bed in horticultural terms, has the same meaning as in large farming ; it means a slight elevation of the soil bounded by two small alleys or paths, which facilitate the weeding and the watering of the plants.

Q. What is meant by a square bed divided by lines ?

A. In a square bed divided by lines there are neither small alleys nor paths, but the plants are laid out in rows and spaced from 18 inches to two feet, so as to allow the gardener to circulate with ease between each row.

Q. What average width ought to be given to the beds ?

A. The width to be given to the beds, should not exceed four feet, in order that the gardener may reach easily the centre of the bed for weeding and watering purposes.

Cultivation of the garden.

Q. What are the principal rules to be observed in the cultivation of a garden.

A. The principal rules to be observed are the following ; 1° the soil should be light or loosened, and level ; 2° it should be sufficiently dunged or manured ; 3° it should he watered ; 4° it should be weeded when necessary.

Dungs, watering and weeding.

Q. What kind of dung is best suited for gardening ?

A. All dungs are suited for gardening, providing they have sufficiently fermented ; one of the best is that of the horse or sheep, or both mixed with a half or a third of cattle dung.

Q. In what state ought this dung to be used ?

A. This dung ought to be used when half or three quarters rotten and after it has thoroughly fermented.

Q. Why is it better to use rotten or well fermented dung for gardening purposes ?

A. For several reasons ; in the first place, green dung or dung which has not fermented contains a large quantity of weeds, which sprout when spread over the soil and soon infest the garden ; in the second place, rotten dung or dung which has fermented has already been reduced to a sappy state,

so that plants find in it their nourishment already prepared, which operation takes a long time in green and unfermented dungs.

Q. Which is the best method to be adopted for the preparation of good dung for gardening purposes ?

A. The best method is the following ; a heap of dung from six to ten feet in width and from five to ten feet in height, according to the extent of the garden to be cultivated, is placed under a shed built with a few boards or deals. After six weeks or two months, the heap should be stirred with a pitch fork, divided and mixed in order to throw inside the heap, that which was outside ; in this manner the heap ferments and heats evenly throughout all its parts ; the dung thus acquires its full value, and all the weed seeds it contains are destroyed.

Q. What do you think of the habit that a large number of Canadian gardeners have, of carting their green dungs into heaps in their gardens as soon as the fall sets in ?

A. This practice is wrong, because it causes a great loss of dung when the heavy fall rains and the spring thaw set in. The dung, moreover, not having fermented or heated, is full of weed seeds.

Q. Do you know of any other manure that can be made use of with advantage for gardens ?

A. The other manures are ashes, lixiviated or not, slops of all kinds, soot, urines &c., the whole

made into compost, that is to say, mixed with earth, swamp earth, tree leaves or with the weedings &c.

Q. In what manner should the dung be mixed with the earth ?

A. The dung should be mixed with the earth, so as not to be sunk to too great a depth, that is, to not more than five or six inches. If the dung is too deeply sunk, the roots of the plants cannot reach it and cannot draw their nourishment from it.

Light, heat and water.

Q. Are light, heat and water very important to vegetation ?

A. They are indispensable to the vegetation of all plants ; without them the plants can neither develop nor grow.

Q. What consequence must result therefrom with regard to gardening ?

A. The consequence to be drawn therefrom is, that if trees are planted in gardens they must be spaced sufficiently, so that their shade may not interfere with the beneficial action of the sun. Small fruit trees such as current bushes, goose berry bushes, dwarf apple trees, intermixed with flowers, are the only plants which should be grown on garden borders.

Q. How can the excess of heat or light be remedied ?

A. It is chiefly remedied in two different ways; 1° by means of a strawy dressing; 2° by watering.

Q. What is a strawy dressing?

A. A strawy dressing consist's generally of a mixture of tree leaves and short straws with dung, in the proportion of about one half of the first two and one half of the last which has been allowed to heat and to rot during several months. An excellent dressing is the dung which has already served in the hot beds.

Q. How is this strawy dressing used?

A. It is used as a coating to protect certain plants when once they have started, or a short time after they have been transplanted; it is applied on the rows or on the beds, so that the earth be completely covered by it.

Q. What precautions should be taken before coating the soil with this strawy dressing?

A. The only precaution to be taken is that of delving the ground, that is to say, of loosening the soil around the plants with the weed hook or the scraper, because, once the dressing is applied, the soil must be left untouched.

Q. What is the effect of this delving?

A. The effect of this delving is to make the soil so light, that the slightest rain showers or the night dew may reach easily the roots of the plants through the dressing.

Q. What good effects result from the use of strawy dressings ?

A. The good effects of this strawy dressing are the following : 1° it protects the feet of the plants against the ardent rays of the sun ; 2° it keeps the soil moist, which does away with frequent waterings ; 3° they prevent the growth of weeds and render weeding unnecessary. 4° the salts contained in the strawy dressing gradually penetrate the soil and contribute to the nourishment of the plants.

Q. Is watering very important in gardening ?

A. Watering is of the highest importance, especially in the beginning ; without it, it is useless to expect fine and good products.

Q. How is this watering done ?

A. This watering is done in different ways. There should be in the garden or in its neighbourhood, a well, a spring, a river or a reservoir of some sort ; watering is done either by hand by means of watering pots, or with pumps. When gardens are situated at the foot of a hill, small aqueducts can be made by which watering can be done with the greatest facility.

Q. Can well or spring water be always used immediately for watering ?

A. This water is sometimes too cold to be used immediately ; it must then be allowed to warm in the sun, in barrels or other recipients.

Beds.

Q. What is a bed ?

A. A bed is a layer of more or less thickness, composed of dung covered by a few inches of prepared earth, in which are sown the seeds of a large number of vegetables and plants, so as to insure and activate their vegetation.

Q. How many kinds of beds are there ?

A. There are three different kinds of beds : 1° the hot bed. 2° the lukewarm bed. 3° the open air or cold bed.

Q. Which of these three kinds of beds best suits in this country.

A. The hot bed ; but the open air or cold bed is best adapted to the cultivation of melons.

Hot beds.

Q. How would you prepare a hot bed for the useful garden of an ordinary farmer in this country, supposing the garden to be one acre square ?

A. I would begin by building a first layer of fresh dung of from 14 to 15 feet in length, 7 feet in width and 2 feet high. This dung ought to be well pressed and beaten down under the feet. I would build with common boards a frame 12 feet long, 4 feet wide and 2 feet high. I would then place this frame on the dung layer so that the dung would exceed the frame of from a foot to a foot and a half length-

ways as well as crossways ; I would also put a certain quantity of dung all around the frame so that the sashes only could be seen ; the last operation would be to cover the frame with ordinary windows.

Q. Why should the layer of dung exceed by a foot or a foot and a half the wooden frame laid upon it ?

A. To protect the seed bed which is inside the frame against the cold.

Q. In what position with regard to their exposure, should these beds be built ?

A. The beds should be built in such a manner as to be exposed from north to south. In other words, the beds should be laid lengthways east and west and north and south cross-ways, so that the plants may be better exposed to the beneficial action of the sun, and better protected from the north wind.

Q. Ought the windows to be laid flat on the frames, or ought they to be inclined or sloping ?

A. The windows should be inclined and the sloping from north to south. This sloping or inclined plane is obtained by making the frame one third higher on its north side than on its south side.

Q. What is the object of this slope from north to south ?

A. It has two different objects in view ; 1° to faci-

litate the escape of the rain and shower water ; 2° to help the concentration of the rays of the sun.

Q. What should be placed on the top of the layer of dung contained in the wooden frame ?

A. On the top of this dung a coating of from three inches and a half to five inches of good light, and fat sandy soil, should be laid. If this soil is mixed with mould, or with good rotten forest or swamp soil, so much the better.

Q. How long after the bed has been prepared should this good soil or mould be laid on ?

A. Four or five days after the bed has been prepared ; that is to say when the dung is in a state of fermentation.

Q. How would you prepare the necessary dung for a hot bed in this country ?

A. This dung can be prepared in different ways ; but the following method suits best in most cases. Three barrels of fresh horse or sheep dung are mixed with a barrel of cow dung with the pitch fork. This mixture is left to ferment in heaps during one week and then mixed or stirred over again with the pitch fork. After a fortnight, the dung has acquired all the necessary qualities to allow it to be put in the beds.

Q. At what time of the year, should the hot beds be prepared and sown ?

A. The hot beds ought to be prepared and sown, between the 15th of March and the 1st of April.

Q. In what manner are the beds sown ?

A. About ten days after the bed has been prepared, that is to say, when it has thrown off its heat and lost the greater part of its warmth, small furrows of about half an inch deep are traced on the bed with the finger. The seeds are sown in the furrows and covered with a little earth ; the surface of the bed is then levelled and watered immediately, care having been taken to label each furrow in order that later on the sprouts may be known from each other.

Q. What are the precautions to be taken after the beds have been sown ?

A. The beds should be watered or wet twice or four times a week. Every day, when there is no frost the windows ought to be slightly opened during four or five hours, between 10 in the morning and 3 in the afternoon, so as to allow the air to be renewed, so as to cool the beds when its heat has become too great.

Q. What other precautions should be taken during the day ?

A. During the day, when the sun is scorching, the windows should be covered with a little straw or fir branches, so as to protect the sprouts in some degree, from the strong action of the rays of the

sun. In Canada however, this precaution is not generally required.

Q. What care do the beds require during the night ?

A. During the night, immediately after sunset, the beds must be covered with mats or rugs so as to protect the sprouts from the cold.

Pricking or Replantation.

Q. What is next to be done to the plants after they have sprouted in the hot beds ?

A. If the best products are desired, without risk, the sprouts ought to be pricked or replanted.

Q. How is this pricking or replantation done ?

A. The sprouts are then taken out of the bed, care being taken not to hurt the roots or the leaves, and replanted in another bed, or in another part of the same bed, which has been set apart for this purpose. Small holes being made with the finger in this new bed ; two or three inches apart, a sprout is put in each of these holes, placing it so that the root be not cramped, and they are then covered with a little earth.

Q. At what time should this pricking or replanting be done.

A. It should be done as soon as the leaves of the

sprouts are sufficiently developed to allow of their being distinguished one from the another.

Q. How should the sprouts be treated after they have been pricked or replanted?

A. Immediately after they have been replanted the sprouts must be watered, the windows covered with rugs or mats hermetically closed, and should not be opened before two or three days.

Q. What is to be done at the expiration of these two or three days?

A. After these two or three days, the windows are slightly opened, if the weather is not too cold, to air the sprouts, the opening of the windows ought to take place early in the morning or late in the afternoon, because between the hours of ten and three the windows should be closed and covered with the mats. Or the fourth or fifth day, the mats are to be removed, the sprouts having sufficient vigour to withstand the action of the rays of the sun.

Transplantation.

Q. What is to be finally done with these replanted sprouts?

A. As soon as the sprouts have acquired sufficient vigor, and as soon as the exterior temperature is warm enough to save them from the frost, that is, in the first ten days of June, they are generally transplanted.

Q. What does this transplantation consist in ?

A. This transplantation consists in carefully uprooting the pricked sprouts, and putting them in their proper place or in the open air, that is in the garden beds, the soil of which must have been prepared with all the care already mentioned.

Q. What precautions should be taken before, during and after transplantation ?

A. A few days before the transplantation, weather permitting, the covering of the pricked sprouts, should be removed, so as to accustom them to the contact of both air and light. The sprouts are then carefully laid bare with a small trowel, so as not to injure the roots. To attain this end, it is better to remove a small lump of earth along with the roots. The plants thus uprooted should be transplanted on the garden beds at a distance of from six inches to four feet from one another, according to the nature of the plant.

Q. What are the plants and vegetables most in use in this country, that should be sown in hot beds ?

A. They are, celery, curled endive, cabbages, turnip-cabbages, swedish turnips, cucumbers, lettuce, melons, allspice, leeks, radishes of all kinds, tomatoes, tobaccos &c., and all kinds of flowers.

Q. What are the principle vegetables, generally sown on the spot, that is in the open air, or in the.

garden, without having previously sprouted in hot beds ?

A. They are : beets, carrots, swedish turnips, turnips, cucumbers, pumpkins, spinage, mazagan beans, onions, leeks and parsnip &c.

Q. Give the names of some of the most useful vegetables which can be cultivated with the greatest advantage in Canadian gardens ?

A. These vegetables, are : garlic, artichokes, asparagus, red beet for salads, cardoons, celery, cherfil, curled endive, cabbages, swedish turnips, radish-cabbage, green onions, chiver, pumpkins, cucumbers, vegetable marrow, coleworts, indian water and cresses, jersey shalots, Holland spinage, mazagan beans, giramons, french beens, lettuce of all kind, melons, onions, sorrel, parsnips, parsley, leeks, salsify, dendelion, tomatoes, tetragons or New-Zeland spinage.

Animals destructive to gardens.

Q. What are the principal animals destructive to gardens ?

A. The principal animals destructive to gardens are: 1° The white worm which is chiefly destroyed by hand ; 2° the earth puceron, which attacks principally cabbages and turnips ; a good protection for young plants is to spread a heavy layer of ashes on the leaves, when they are moist as for instance in the morning, after the dew has formed ; another

mode of protecting them is to sow a few seeds of buckwheat between the rows ; 3° green and gray caterpillars, which are hidden during day light, and must be searched for during night time, with a light, and destroyed with the hand ; 4° slugs, which may be destroyed with a small sharp stick, in the evening or morning, because during the day time they hide beneath the ground : 5° grubs, against which fumigations are made use of with advantage ; another way is to cut the leaves and the end buds which are infected and to throw them into the fire.

Q. When should destructive animals be destroyed ?

A. As soon as they appear, and better still during the night, by the light of a candle, for most of them.

Q. Do you know of any efficacious mode of destroying insects and destructive animals ?

A. Yes ; by protecting the birds which feed on them and thus destroy them by millions.

ARBORICULTURE

OR

THE CULTIVATION OF TREES.

Q. How is arboriculture divided ?

A. Arboriculture is divided into two principal parts, according to whether it is intended to grow. 1° fruit trees, 2° ornamental trees.

Q. What kind of soil is most suitable for the rearing of these various trees ?

A. The nature of the soils that are most suitable, varies according to the different kinds of trees ; thus, some kinds grow better in soils which are rather heavy or moist, and others in light or warm soils ; but with proper care, all soils may be made suitable for the rearing of fruit bearing trees.

Q. When it is intended to plant trees in soil naturally unsuitable to them, what precautions are to be taken ?

A. The first thing to be done is to improve the soil, so as to impart to it the necessary physical properties. These improvements in the case of arboriculture are effected in the same way as in horticulture and agriculture.

Q. What would be the result if trees were planted in a naturally unsuitable soil, or in a soil that has not been properly improved.

A. The trees would soon die, or would bear but little fruit or fruit of a poor quality.

Reproduction.

Q. How are trees reproduced ?

A. Trees are reproduced 1° by sowing ; 2° by layering ; 3° by slips or sets ; 4° by scions ; 5° by grafting.

Q. What does the sowing consist in ?

A. It consists in sowing the seeds of the plants in a properly prepared soil ; this method is seldom resorted to.

Q. What does layering consist in ?

A. It consist first in making an incision or longitudinal slit near the eye of the branch, then to lay it down, and to cover with earth the part which has been slit and incised. This operation hastens the formation of the roots.

Q. What is understood by the words slips or sets?

A. The slip or set is a branch or bough of the same year which is taken from a tree and transplanted, so as it may bring forth roots.

Q. What is meant by scions or shoots ?

A. The scions or shoots are plants which develop on the roots of old trees. These young plants are removed, by separating them from the main roots, and by transplanting them for good and all or placing them in the nursery.

Q. What is meant by grafting ?

A. Grafting is an operation which consists in inoculating or in grafting upon a tree or plant, a branch or scutcheon belonging to another plant or an other tree. These grafts produce the fruits of the tree from which they have been taken.

Apple-Trees.

Q. Where should apple-tree plants be purchased ?

A. They should be purchased from the nursery-men where grafted plants of the first quality can now be had in Canada, and generally very superior to any thing that one might himself prepare.

Q. What soils are best suited for apple-trees ?

A. Nearly all the soils agree with them, provided they are well prepared and well taken care of.

Q. What precautions does the land which is to be converted into an orchard, require ?

A. This land, as all lands selected for the cultiva-

tion of all kinds of fruit-trees, should be beforehand well loosened and manured by the cultivating of corn, or better still, of vegetables. In strong or moist soils irrigation by drainage or otherwise should be most carefully looked after, because the excess of dampness is injurious to all fruit-trees.

Q. At what time should the planting of the apple-trees take place?

A. This planting should nearly always take place in the spring. For this purpose one should provide himself with plants the preceeding fall and keep them provisionally laid in the ground during the winter.

Q. How is this provisional laying done?

A. A hole or gutter is dug in loose, dry and well drained soil, such for instance as a garden soil. This hole or gutter should be large enough to receive the roots of the plants arranged in swaths. The plants are laid on the soil, so that the roots and lower part of the stem may rest in the hole or gutter; the roots are then covered with about 12 inches of earth at least, and the stems are left exposed to the air, reclining on the soil.

Q. How is the planting done in the spring?

The soil of the future orchard having been well levelled beforehand, and the holes destined to receive the roots of the plants being made at proper distances, that is from 20 to 30 feet from each other

on all sides, and laid out straight in a line; the roots of the trees are then placed in them, covered with well loosened earth slightly pressed with the foot, and each tree is fastened to a prop. These props or pickets should be placed in such a manner, that the fastening which binds them to the tree or the pickets themselves, do not injure the trees.

Q. What should be the dimensions of the holes in which apple-trees are to be planted?

A. These holes should have from 3 to 4 feet in diameter so as to allow the roots to spread themselves out easily and not become entangled, and should be from 2 to 2½ feet deep. If the holes have been dug the preceeding fall, so much the better.

Q. Please state what important care the apple trees require after they have been planted, and during the two or three following years?

A. The principal precautions to be taken, are 1° to see that they are watered from time to time, especially during the first year, when the prolonged droughts set in; 2° to have the grass which grows around the foot of each tree, removed and the soil kept well loosened; 3° to cause a little well rotten dung,—never green dung,—to be spread every year on the earth which covers the roots; 4° the branches should be cut or nipped, so as to give each tree a good appearance; 5° during the three or four first years, before the snow falls, the branches should be united

in a bunch with straw or other fastenings so that they may not suffer any damage from the snow or sleet.

Q. What does the pruning of trees consist in ?

A. The pruning consists in cutting and removing more or less of the extremities of the branches, and even whole dead-branches or suckers, which operation gives the trees a pleasant appearance and causes them at the same time to bear fruits in greater abundance and of a better quality.

Q. When a branch is removed by pruning, at what distance from the trunk of the tree or from the main branch should this operation be performed ?

A. This operation should be performed even with the trunk of the tree to avoid stumps.

Q. What is a sucker ?

A. A sucker is a branch that grows luxuriantly that is, a branch which develops at the expense of the sap of the tree and the other branches, thus depriving them of their own sap or nourishment.

Q. What is to be done with these suckers ?

A. They should be pruned, that is removed.

Q. At what time of the year should this pruning of the apple-trees and other fruit trees be performed ?

A. It should be performed especially in the spring, during the months of March and April.

Q. What does the nipping of trees consist in ?

A. It consists in cutting or nipping with the end of the fingers the buds which develop on a stem or a branch. This nipping, like pruning, prevents the growth of a new branch, prevents also a branch from growing too much at the expense of the sap destined to the other branches. When done in time, nipping in a great many distances, is an excellent substitute for pruning.

Q. At what time of the year should the nipping be performed ?

A. At any time, during spring or summer.

Q. To what height should the trunks of apple-trees be allowed to grow naked or branchess ?

A. From five to six feet.

Q. How can this height be given them ?

A. In removing from year to year some of the lower branches of the tree, till the naked stem has attained the desired height.

Q. Is the pruning of the apple-tree and other fruit trees very important?

A. It is of such importance, that if is not done, fruit trees will only bear a few inferior fruits.

Plum-trees.

How are plum-trees propagated ?

A. Plum-trees are propagated by scions, by sowing, or by grafting.

Q. What soil best agrees with plum-trees ?

A. A soil that is not too sandy, nor too clayey, and is slightly moist.

Q. What preliminary preparations does the land on which plum-trees are to be planted, require ?

A. The same as apple-trees, that is ; improvements manuring, draining in over-strong or over-moist soils &c.

Q. What care do the plum-trees require when they are being planted and afterwards ?

A. The same care as the apple-trees, with this difference however, that the plum-trees require much more pruning and nipping, on account of their numerous sucking branches. The earth at the foot of the trees should always be carefully cleaned and loosened by often repeated delvings and weedings.

Once a year, at least, a layer of well rotten dung, should be spread around the foot of each tree.

Q. At what distance from one another should the plants be planted ?

A. At a distance of from twelve to fifteen feet.

Q. To what height should the stem of plum-trees be allowed to grow naked or branchless ?

A. To three or four feet.

Cherry-trees.

Q. What soils best agree with cherry-trees ?

A. Dry and sandy soils generally, but they thrive

well in certain fat and moist soils, provided they be sufficiently drained.

Q. What mode of reproduction is most in use ?

A. That of sowing or grafting.

Q. What care do the plants require when they are being planted and afterwards ?

A. The same care as the apple-trees and plum-trees with this difference however that the cherry tree bears the operation of pruning with more difficulty. The sick branches only, should be removed, and in the spring the shoots of the preceding year should also be cut shorter. All the wounds to the tree caused by pruning should be covered with grafting wax.

Q. How is this grafting wax prepared ?

A. An excellent grafting wax can be prepared in the following manner : by heating and melting together, two parts of bees wax, two of tallow, two of rosin, one of tar and one of sifted ashes.

Q. To what height should the stem be allowed to grow naked ?

A. To the height of from four to five feet.

Gooseberry-bushes.

Q. How do gooseberry-bushes multiply ?

A. They multiply by layering ?

Q. What care do gooseberry-bushes require ?

A. They require manuring with rotten dung, at least every two years, and oft repeated pruning. By this pruning the branches are removed in such a manner that the gooseberry-bush has four or five stems near the surface of the ground.

Q. What is the best mode of protecting the gooseberry-bush from the cold and snow in winter ?

A. The best method consists in laying it down on the soil and keeping it in this position by a few shovelfuls of earth thrown on the extremities of its branches.

Q. At what distance from each other should the gooseberry-bushes be planted ?

At a distance of about three feet.

Currant-bushes.

Q. How are currant-bushes reproduced ?

A. They are reproduced by the shoots of the preceding year, when they have attained from six to twelve inches in length. These shoots are cut, and are sunk in the earth, where they soon take root.

Q. What care do currant-bushes require ?

A. The same as gooseberry-bushes that is : watering in the beginning, manuring from time to time and proper pruning.

Raspberry-bushes.

Q. How do raspberry-bushes multiply ?

A. They multiply by different processes, but chiefly by means of their scions which grow from their roots and are planted in a well loosened soil, which has been well manured the preceeding year.

Q. What care do raspberry-bushes require ?

A. They require only to be pruned and manured every two or three years. The pruning consists in cutting and removing the stems having already borne fruit, without interfering with the new ones which have not as yet borne any. The ground, around each foot of each bush, should be frequently weeded, and the numerous shoots which grow from the roots should also be carefully removed. To protect them from the weight of the snow in winter, they should be laid on the ground, in the same manner as gooseberry-bushes.

Q. At what distance from each other should they be planted ?

A. At a distance of from three to four feet and they ought to be supported by props.

Strawberries.

Q. How are strawberries reproduced ?

A. They are reproduced chiefly by their stolons or runners which have taken root.

Q. How are strawberries planted ?

A. They are planted in rows. These rows should be from eighteen inches to two feet apart, and the

plants from ten to twelve inches asunder in the rows.

Q. What is the best time of the year to plant strawberries ?

A. In the months of August and September. They should be watered during the two or three days following their planting, and for a longer time if necessary.

Q. How long do strawberries last when properly attended to ?

A. They may perhaps last for seven or eight years but it is better not to keep them longer than three or four years. After this last period, the roots of the plants degenerate, the fruits lose their beauty, and; it is more economical to plant young ones than to take care of the old ones.

INDEX.

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Agriculture.

Nourishment of plants..... 3
Various kinds of soil..... 4
Improvements..... 6
Tilling of the soil..... 8
Ploughing..... 9
Harrowing 14
Rolling..... 16
Drainage..... 17
Manure and Dungs..... 22
Stable Dung..... 23
Treatment of dungs 25
Different kinds of dung 28
Green or vegetable Manure..... 31
Lime and liming 33
Ashes..... 36
Plaster or Gypsum..... 37
Fish, Varech..... 38
Slops, Sweepings &c..... 39
Chemical manures..... 39
Adaptation of seeds to soils..... 40
Sowing and harvesting; 42
Cultivation of vegetables..... 46
Meadows..... 53
Pastures..... 59
Stock or Domestic Animals..... 60

Cows 61
Swine 63
Sheep 64
Agricultural implements 66
Rotations 66
Methods of Cultivation 69
Farmer's Book-keeping 70

GARDENING OR HORTICULTURE 75

Soils suitable for gardening 76
Dimensions and division of the garden 78
Cultivation of the garden 80
Light, heat and water 82
Beds 85
Hot beds 85
Pricking or Replantation 89
Transplantation 90
Animals destructive to gardens 92

ARBORICULTURE.

Reproduction 96
Apple-Trees 97
Plum-Trees 101
Cherry-trees 102
Gooseberry-bushes 103
Currant-bushes 104
Raspberry-bushes 104
Strawberries 106

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